

PART I - ADMINISTRATIVE

Section 1. General administrative information

| | |
|--|----------------------------|
| Title of project Select Area Fishery Evaluation Project | |
| BPA project number | 9306000 |
| Contract renewal date (mm/yyyy) | 10/1999 |
| Multiple actions? (indicate Yes or No) | No |
| Business name of agency, institution or organization requesting funding Oregon Dept. of Fish & Wildlife, Washington Dept. of Fish & Wildlife, Clatsop County Economic Development Council | |
| Business acronym (if appropriate) | ODFW, WDFW, CEDC |
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| NPPC Program Measure Number(s) which this project addresses 8.3C | |
| FWS/NMFS Biological Opinion Number(s) which this project addresses Biological Opinion for 1995-98 Hatchery Operations - Lower Columbia. Consultation No. 383. Fall Harvest Biological Opinion No. 898. Impacts on Listed Snake River Salmon by Fisheries Conducted Pursuant to the 1996-1998 Management Agreement for Upper Columbia River Fall Chinook: Biological Opinion, Endangered Species Act - Section 7, Consultation. Impacts of the 1996-1998 Management Agreement for Upper Columbia River Spring | |

Chinook, Summer Chinook, and Sockeye on Listed Snake River Salmon: Biological Opinion, Endangered Species Act - Section 7, Consultation. Biological Opinion on Impacts of the Select Area Fishery Evaluation Project (SAFE) on Salmon and Steelhead Species in the Columbia River Basin Listed under the Endangered Species Act - NMFS, 1998

Other planning document references
Snake River Salmon Recovery Plan (NMFS): 3.4.b.;
Strategy for Salmon, V3 (NPPC): 5.3C;
UPSTREAM: Salmon and Society in the Pacific Northwest (Hatchery changes to assist recovery of wild populations, chapters 6, 11 & 12);
Lower Columbia River Terminal Fisheries Project: DOE/EA - 1040;
Washington Department of Fish and Wildlife. Wild Salmonid Policy - Final Environmental Impact Statement. September, 1997 (Chap. IV, Sect. 3.3, pp 76-79);
Lower Columbia River Salmon Business Plan for Terminal Fisheries, Final Report: DOE/BP - 39254-1. October, 1996.

Short description
Enhance harvest opportunities through creation and expansion of hatchery salmonid fisheries in the lower Columbia River while protecting depressed stocks. Develop fisheries through application of results from experimental net-pen rearing, and monitor and evaluate experimental effects on habitat at net-pen sites.

Target species
Lower Columbia River early stock coho, select area bright (Rogue stock) fall chinook, Willamette and Cowlitz spring chinook are targeted for harvest. Listed and weak stocks are keyed for protection.

Section 2. Sorting and evaluation

Subbasin
 Lower Columbia River basin and side channels, including: Deep River, Steamboat Slough (Skamokawa Cr.), Youngs Bay, Tongue Point Basin, Blind Slough (Gnat Cr.), and Clifton Channel.

Evaluation Process Sort

| CBFWA caucus | | CBFWA eval. process | | ISRP project type |
|----------------------|-----------------|---|---|-------------------------------------|
| X one or more caucus | | If your project fits either of these processes, X one or both | | X one or more categories |
| X | Anadromous fish | X | Multi-year (milestone-based evaluation) | Watershed councils/model watersheds |
| | Resident Fish | | Watershed project eval. | Information dissemination |
| | Wildlife | | | Operation & maintenance |

| | | |
|--|---|-------------------------------|
| | | New construction |
| | | Research & monitoring |
| | X | Implementation & mgmt |
| | | Wildlife habitat acquisitions |

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

| Project # | Project title/description |
|-----------|--|
| 20515 | Mainstem Columbia and Snake Rivers (ODFW umbrella) |
| 9306000 | Evaluate Columbia River Select Area Fisheries |
| | |
| | |

Other dependent or critically-related projects

| Project # | Project title/description | Nature of relationship |
|-----------|---|---|
| 9702400 | Avian Predation on Juvenile Salmonids | Effects of Predation on SAFE Project. |
| 9202200 | Wild Smolt Behavior/Physiology (ESA) | Rearing Strategies Using Net Pens |
| 8201300 | Coded-Wire Tag Recovery | Coordinated CWT Recovery Program |
| 8906900 | Annual Coded-Wire Tag Program-Missing Production OR HTC (ODFW) | CWT Program for Comparison of Study Fish to Production Fish |
| 8906600 | Annual Coded-Wire Tag Program - Missing Production WA HTCH (WDFW) | CWT Program for Comparison of Study Fish to Production Fish |

Section 4. Objectives, tasks and schedules

Past accomplishments

| Year | Accomplishment | Met biological objectives? |
|------|--|--|
| 1994 | Categorized, ranked and selected potential sites for further study. | Documented low level impacts on weak stocks through test fishing research. |
| 1994 | Established water quality monitoring programs at each selected site. | Fish rearing operations show no immediate detrimental effects to aquatic ecosystems. |
| 1995 | Implemented coho rearing and release activities at three selected sites (Tongue Point, Blind Slough and Deep River) and expanded existing Youngs Bay production. | Successfully released 610,000, 815,000, 774,000, and 598,000 coho smolts in 1995, 1996, 1997 and 1998, respectively. |
| 1996 | Established fall salmon harvest | Commercial coho catches totalled |

| | | |
|------|--|--|
| | opportunities in the three new selected areas and Youngs Bay in 1996, 1997, and 1998. | 22,300, 17,000, and 25,000 in 1996, 1997, and 1998, respectively. Commercial fall chinook catch totalled 1,700 in 1997 and 1,600 in 1998. |
| | | Attained nearly 100% harvest of coho adults resulting from net-pen releases of 1993 brood at the three new sites and Youngs Bay. 1994-95 brood results are pending CWT data base access. |
| | | Maximized harvest of target stock and minimized effects of potential straying. |
| | | Minimized harvest impacts on listed Snake River fall chinook and chum salmon. Documented 5 chum salmon caught and less than 1 (one) Snake River wild fall chinook in 1996; and 4 chum salmon and 1 (one) Snake River wild fall chinook caught in 1997. |
| 1996 | Attained expected survival advantage from select area releases of coho. | Adult survivals ranged from 1.6 to 3.8% compared to 0.2 to 0.9% for traditional hatchery released coho. |
| 1995 | Implemented fall chinook rearing and release activity in Youngs Bay. | Successfully released 544,000, 608,000, 519,000 and 118,000 fall chinook smolts in 1995, 1996, 1997, and 1998, respectively. |
| 1995 | Implemented spring chinook rearing and release activities in the three new sites and Youngs Bay. | Successfully released 450,000 spring chinook smolts from Youngs Bay in 1995. |
| | | Successfully released 890,000 spring chinook smolts from Youngs Bay, Tongue Point and Blind Slough in 1996. |
| | | Successfully released 937,000 spring chinook smolts from Youngs Bay, Tongue Point and Blind Slough in 1997. |
| | | Successfully released 1 million spring chinook smolts from Youngs Bay, Tongue Point, Blind Slough, and Deep River in 1998. |
| 1997 | Established spring chinook harvest opportunities in Youngs Bay, Blind Slough and Tongue Point. | Commercial catch of 1,820 spring chinook from Youngs Bay in 1997. |
| | | Commercial catch of 2,200 spring |

| | | |
|--|--|--|
| | | chinook from Youngs Bay, Blind Slough and Tongue Point in 1998. |
| | | First significant select area recreational harvest occurred in Youngs Bay in 1998; catch of 75 adult spring chinook estimated. |
| | | Minimized harvest impacts on listed Snake River wild spring chinook: 1 (one) and 2 mortalities in 1997 and 1998, respectively. |

Objectives and tasks

| Obj 1,2,3 | Objective | Task a,b,c | Task |
|----------------------|---|-----------------------|--|
| 1 | Determine suitability of the Deep River, Steamboat Slough, Tongue Point Turning Basin, Blind Slough, and Clifton Channel sites for rearing and release of salmon. | a | Conduct water quality monitoring program for rearing areas in selected sites for the entire year. |
| | | b | Collect and analyze homing and straying information from releases at current net-pen sites. |
| 2 | Determine the potential for the Tongue Point Turning Basin, South Channel, Deep River, Blind Slough, Prairie Channel and Steamboat Slough. | a | Conduct limited test fishing during spring and fall periods to determine relative abundance and timing through the area of non-target fish stocks. |
| | | b | Initiate and evaluate commercial and recreational select area fisheries. |
| 3 | Evaluate the suitability of various anadromous fish stocks for use in select area fishing sites. | a | Evaluate the effects of various rearing regimes in Oregon for spring chinook on survival and contribution to fisheries. |
| | | b | Evaluate the effects of various rearing regimes in Washington for spring chinook on survival and contribution to fisheries. |
| | | c | Evaluate effects of various rearing regimes for Oregon select area bright fall chinook on survival, contributions to fisheries, and straying. |
| | | d | Evaluate the effects of various rearing requirements in Oregon for upriver bright fall chinook on survival, |

| Obj 1,2,3 | Objective | Task a,b,c | Task |
|----------------------|--|-----------------------|---|
| | | | contribution to fisheries, and straying. |
| | | e | Evaluate effects of various rearing regimes in Oregon of early stock lower Columbia River coho on survival and contribution to fisheries. |
| | | f | Evaluate effects of various rearing regimes in Washington of early stock lower Columbia River coho on survival and contribution to fisheries. |
| 4 | Coordinate activities with WDFW, ODFW, CEDC, BPA, NMFS, and SFA. | a | Coordinate all objectives, tasks, and activities undertaken jointly to ensure complementary products and minimal overlap of actions. |
| 5 | Continue development activities to provide for additional research capabilities at the Clifton site. | a | Undertake initial site preparation and obtain necessary permit approvals. |
| 6 | Compile and report SAFE project results | a | Complete 1998 annual report. |
| | | b | Begin 1999 annual report. |
| | | c | Provide detailed report to NMFS on observed and estimated impacts to listed species resulting from SAFE project activities. |

Objective schedules and costs

| Obj # | Start date mm/yyyy | End date mm/yyyy | Measurable biological objective(s) | Milestone | FY2000 Cost % |
|--------------|-------------------------------|-----------------------------|--|------------------|----------------------|
| 1 | 09/1993 | 09/2003 | Report of measured water quality data by site. | X | 10 |
| | | | Report of homing and straying of fish stocks considered for use. | | |
| 2 | 09/1993 | 09/2003 | Report of relative abundance and run timing of target and non-target species/stocks. | X | 10 |
| | | | Report of select area fishery harvest and biological information. | | |
| 3 | 09/1993 | 09/2003 | Report on development of | X | 60 |

| Obj # | Start date mm/yyyy | End date mm/yyyy | Measurable biological objective(s) | Milestone | FY2000 Cost % |
|-------|-----------------------|---------------------|---|--------------|------------------|
| | | | rearing and release strategies for all species and sites. | | |
| 4 | 09/1993 | 09/2003 | | | 5 |
| 5 | 10/1999 | 10/2000 | | | 15 |
| | | | | Total | 100 |

Schedule constraints

Project is most influenced by availability of juvenile fish; time lines of local permit approvals, favorable biological opinions, and FONSI's related to environmental assessments; and unforeseen environmental influences.

Completion date

2004

Section 5. Budget

| | |
|---|--------------------|
| FY99 project budget (BPA obligated): | \$1,400,000 |
|---|--------------------|

FY2000 budget by line item

| Item | Note | % of total | FY2000 (\$) |
|---|--|---------------|--------------------|
| Personnel | | 33 | 501,683 |
| Fringe benefits | | 13 | 191,749 |
| Supplies, materials, non- expendable property | Variable costs (ie. fish food, CWTs, replacement supplies, tagging) | 26 | 386,705 |
| Operations & maintenance | Annual fixed costs (ie. leases and fees) | 6 | 91,518 |
| Capital acquisitions or improvements (e.g. land, buildings, major equip.) | Includes new site development. | 6 | 88,686 |
| PIT tags | | | |
| Travel | | 3 | 37,832 |
| Indirect costs | | 10 | 157,233 |
| Subcontractor | | 3 | 44,594 |
| Other | | | |
| TOTAL BPA REQUESTED BUDGET | | | \$1,500,000 |

Cost sharing

| Organization | Item or service provided | % total project cost (incl. BPA) | Amount (\$) |
|---|--|----------------------------------|------------------|
| BPA | Project research | 75 | 1,500,000 |
| Commercial Fishermen | Voluntary assessments | 1 | 20,000 |
| WDFW/ODFW/NMFS hatcheries | Hatchery facility rental and fish for research | 17 | 350,000 |
| WDFW | CWT tagging | 3 | 50,000 |
| Salmon for All | Education / Promotion | 3 | 50,000 |
| City of Astoria | Site lease | 1 | 10,000 |
| Total project cost (including BPA portion) | | | 1,980,000 |

Outyear costs

| | FY2001 | FY02 | FY03 | FY04 |
|---------------------|-------------|-------------|-------------|-------------|
| Total budget | \$1,500,000 | \$1,500,000 | \$1,500,000 | \$1,500,000 |

Section 6. References

| Watershed? | Reference |
|------------|---|
| | NMFS, 1998. Biological Opinion on Impacts of the Select Area Fishery Evaluation (SAFE) Project on Salmon and Steelhead Species in the Columbia River Basin Listed under the Endangered Species Act. National Marine Fisheries Service. 15 pp. |
| | NPPC, 1991. Northwest Power Planning Council, 1991. Amendment to the Columbia River Basin Fish and Wildlife Program (phase two). 87 pp. |
| | NPPC, 1992. Northwest Power Planning Council, 1992. Strategy for salmon. Volume II. 98 pp. |
| | BPA, 1996. Hirose, Paul, Marc Miller and Jim Hill. 1996. Columbia River: Terminal Fisheries Research Project, 1994 Annual Report. Bonneville Power Administration: DOE/BP - 05409-1. 151 pp. |
| | BPA, 1998. Hirose, Paul, Marc Miller & Jim Hill. 1998. Columbia River: Select Area Fishery Evaluation Project, 1995-1996 Annual Reports. Bonneville Power Administration. 194 pp. |
| | Hirose, P.S. 1997. Evaluation of the 1991-1992 brood overwinter-reared coho released from net pens in Youngs Bay, Oregon. Final Completion Report prepared for Bonneville Power Administration. |
| | BPA, 1995. Lower Columbia River Terminal Fisheries Research Project, Final Environmental Assessment. Bonneville Power Administration. |

PART II - NARRATIVE

Section 7. Abstract

In its 1993 Strategy for Salmon, the Northwest Power Planning Council recommended that terminal fishing sites be identified and developed to harvest abundant fish stocks while minimizing the incidental harvest of weak stocks. The NPPC called on BPA to “Fund a study to evaluate potential terminal fishery sites and opportunities”. In response, BPA initiated the Columbia River Terminal Fisheries Project, a 10-year program with the goal of determining the feasibility of creating and expanding known stock fisheries in the Columbia River Basin to allow harvest of strong anadromous salmonid stocks while providing greater protection to depressed stocks. The project is being conducted in three stages: an initial 2-year research phase to investigate potential sites, salmon stocks and methodologies; a second 3-year phase of expansion in Youngs Bay and introduction into areas of greatest potential; and a final 5-year phase establishing fisheries at full capacity at all acceptable sites.

The project, currently named the Select Area Fishery Evaluation (SAFE) Project, is in the 5th year of the 10-year program and is operating under a Section 7 Consultation conducted by NMFS (Nov. 18, 1998) with a finding of “No Jeopardy” to listed stocks (NMFS, 1998). The SAFE project is also operating under the Final Environmental Assessment of Lower Columbia River Terminal Fisheries Research Project (BPA, 1995), and the resultant Finding of No Significant Impact.

Monitoring and evaluation (M & E) activities include: water quality and benthic analysis at net-pen rearing sites to ensure no detrimental damage to critical habitat; tracking escapement returns of SAFE project fish using coded-wire tag (CWT) recoveries to assess straying; fishery evaluation to assess effectiveness of fishers to capture SAFE project fish with minimal impact to non-target weak stocks using CWT recoveries; and evaluation of rearing and release techniques to optimize survival to adult, again using CWT analysis. Extensive M & E activities will be required to assure compliance with the terms and conditions in the SAFE project Biological Opinion.

At the culmination of SAFE project research in 2004, expected outcome is the demonstration that significant and sustainable, known stock fisheries can be implemented while allowing for rebuilding of weak and listed stocks.

Section 8. Project description

a. Technical and/or scientific background

Responsive to the goal of Measure 8.3c of the Northwest Power Planning Council (NPPC) Fish and Wildlife Program, which calls for identification and development of select area fisheries opportunities to harvest abundant stocks while minimizing the incidental harvest of weak stocks, this project addresses the problem of meeting the needs of society for sustainable populations of fish that support harvest while minimizing impacts on protected weak stocks (NPPC, 1992). This project evaluates the alteration of artificial production to fit into the Columbia River ecosystem and applies actions designed to increase understanding through fishery enhancement experimentation that will provide useful information for future management decisions and actions. Through the monitoring and evaluation aspects of this project, valuable information is

continuously being learned that provides direction and application of the adaptive management approach of the Columbia River Basin Fish and Wildlife Program.

Beginning in 1987, CEDC initiated a small scale net-pen acclimation project in Youngs Bay under the leadership of Duncan Law and Jim Hill. As a result of early net pen successes, meetings with BPA, WDFW, CEDC, SFA and local fishing industry representatives prompted further fishery development. In response to amendment measures IV (B)(9)(b) and 5.3C in the NPPC amended Fish and Wildlife Program, which call for the creation of select area fishing opportunities to reduce main-stem Columbia River harvest pressure on depressed Columbia River basin stocks (NPPC 1991, 1992), BPA funded Project No. 92-77: Evaluation of 1991-1992 Brood Overwinter-Reared Coho Released from Net Pens in Youngs Bay, Oregon, conducted by Paul Hirose (ODFW), Jim Hill (CEDC) and Rick Westerhof (BPA). Results included 1) successful estuarine net-pen rearing, 2) adult survivals were at least double those of traditional hatchery programs, 3) high homing instincts were realized with less than 1% stray rates, and 4) nearly all (99%) of the adult production resulted from Youngs Bay coho net-pen releases were accountable in fishery harvests.

b. Rationale and significance to Regional Programs

BPA is responsible for funding measures consistent with the NPPC's (Council) 1994 Columbia River Basin Fish and Wildlife Program (Program), as amended. The goal of the Program is to increase the average annual returns of adult anadromous fish (salmon and steelhead) to the Columbia River Basin by approximately 2.5 million fish. The Council recently amended its Program, and two amendment measures request the investigation of terminal fishing opportunities to reduce potential mainstem harvest pressure on depressed salmon stocks. The need for this proposed action is based upon the Council's language recommending a study of "terminal fishing opportunities to harvest abundant stocks while minimizing the incidental harvest of weak stocks" (BPA, 1995).

In the SAFE project Biological Opinion (NMFS, 1998), NMFS has determined that the proposed action is not likely to jeopardize the continued existence of salmon and steelhead in the Columbia River Basin listed under the ESA, or result in the destruction or adverse modification of their critical habitat. Some adverse impacts to substrate and water quality may occur as a result of net-pen operation, but these effects are very localized. This determination is based on a number of proposed activities intended to reduce the adverse impacts on listed species of disease occurrence, genetic introgression, and resource competition resulting from the release and adult return of SAFE project fish, and on steps taken to minimize the impacts of net-pen operation on habitat conditions in the area of the net pens.

NMFS has also determined that the proposed action is not likely to jeopardize the continued existence of salmonids in the Columbia River Basin proposed for listing under ESA. This determination has the same basis as that given above for listed species. In addition, potential risk to chum salmon from predation by SAFE project coho salmon is expected to be adequately reduced.

This project will demonstrate the feasibility of establishing harvest opportunities on strong hatchery stocks while avoiding impacts to weak stocks, and will demonstrate the need to alter

hatchery rearing and release strategies.

The project goal of evaluating the potential of SAFE project sites is in direct response to the NPPC Fish and Wildlife Program Measure 8.3c, which calls for identification and development of select area fishing opportunities to harvest abundant stocks while minimizing the incidental harvest of weak stocks.

c. Relationships to other projects

In collaboration with Walt Dickhoff (NMFS), Project No. 9202200: Wild Smolt Behavior/Physiology (ESA), naturalized rearing strategies are being researched in estuarine net pens to validate laboratory findings. Information gained will provide direction to apply rearing strategies to optimize smolt-to-adult survival. A bi-monthly sampling schedule to determine various physiological characteristics is in place.

Through information gained from Project No. 9702400: Juvenile Salmonids in the Columbia River Basin, release strategies from estuarine net pens may be employed to avoid excessive avian predation.

Through the three CWT programs [Project No. 8201300: Coded-Wire Tag Recovery; Project No. 8906900: Annual Coded-Wire Tag Program - Missing Production OR HTC (ODFW); and Project No. 8906600: Annual Coded-Wire Tag Program - Missing Production WA HTCH (WDFW)], recovery information is essential for this project to evaluate fishery contributions, escapement levels, total survival rates, and comparison of study fish to production fish.

d. Project history

This project (No. 9306000) is an on-going evaluation initiated through Project #92-77: Youngs Bay Terminal Fishery Project. With results published as a final completion report (Hirose, 1997), feasibility and expansion of potential select area net-pen sites is addressed in the current on-going project. The current project has been underway since FY 93, with a cumulative cost-to-date of \$5,590,000:

| <u>Fiscal Year</u> | <u>Budget</u> |
|--------------------|---------------|
| 1993 | \$417,900 |
| 1994 | \$535,500 |
| 1995 | \$765,400 |
| 1996 | \$785,900 |
| 1997 | \$785,000* |
| 1998 | \$900,000* |
| 1999 | \$1,400,000 |

* Budget shortfall has hindered meeting scheduled project goals.

Based on categorization and ranking of 11 sites in each state, we recommended seven for further

study. Washington sites include Deep River, Steamboat Slough and Cathlamet Channel. Oregon sites include Tongue Point, Blind Slough, Wallace Slough, and Clifton Channel. At all seven sites, we implemented rearing and release research activities. (BPA, 1996)

We established water quality monitoring programs at each of the seven sites. Water temperature, pH, specific conductance, dissolved oxygen, and water turbidity were the physicochemical parameters recorded. A benthic macroinvertebrate sampling program also was established to monitor effects of various fish rearing regimes to ensure no detrimental ecological impacts occur.

We implemented rearing and release activities at Tongue Point, Blind Slough and Deep River, with expansion at the existing Youngs Bay site. Through utilization of net-pen rearing and release strategies, between 600,000 and 815,000 coho smolts were released annually from 1995 to 1998.

Project staff developed and recommended fall salmon harvest opportunities in the three “new” select areas and in Youngs Bay that were adopted by the Columbia River Compact in 1996, 1997 and 1998. During the newly established fishing seasons, commercial coho catches totalled 22,300, 17,000, and 25,000 in 1996, 1997, and 1998, respectively. Commercial fall chinook harvest totalled 1,700 in 1997, and 1,600 in 1998. Nearly 100 percent harvest of coho adults resulting from net-pen releases was realized with adult survival ranging from 1.6 to 3.8 percent. Harvest impacts were minimized on listed stocks with a catch of 5 chum and less than 1 (one) Snake River wild fall chinook documented in 1996; and 4 chum and 1 (one) Snake River fall chinook in 1997.

In 1995 we implemented fall chinook rearing and release activities in Youngs Bay. Approximately 544,000, 608,000, 519,000, and 118,000 fall chinook smolts were released from the net-pen confinements in 1995, 1996, 1997, and 1998, respectively.

In 1995 we implemented spring chinook rearing and release activities in three new sites and Youngs Bay. In 1995 we released 450,000 spring chinook smolts from Youngs Bay under a February, March and April release comparison.

In 1996 and 1997, we successfully released 890,000 and 937,000 spring chinook smolts from Youngs Bay, Tongue Point, and Blind Slough, also applying a February, March and April release study. In 1998, 1 million spring chinook smolts were released from Youngs Bay, Tongue Point, Blind Slough, and Deep River under a March and April release comparison, and also a winter dormancy feeding regime was initiated in Youngs Bay in collaboration with NMFS under Project #9202200.

This project applies actions designed to increase understanding through fishery enhancement experimentation that will provide useful information for future management decisions and actions.

Through the monitoring and evaluation aspects of this project, valuable information is continuously being learned that provides direction and application of the adaptive management approach of the Columbia River Basin Fish and Wildlife Program.

e. Proposal objectives

Five objectives with associated tasks and activities are applied toward the project goal of determining the feasibility of creating and expanding selected area, known-stock fisheries in the Columbia River Basin to allow harvest of strong anadromous salmonid stocks while providing greater protection to depressed fish stocks.

Objective 1. Determine the suitability of the Deep River, Steamboat Slough, Tongue Point Turning Basin, Blind Slough, and Clifton Channel sites for rearing and release of salmon.

Task 1.a. Conduct water quality monitoring program for rearing areas in selected sites for the entire year.

Activity 1.a.1. Measure water column chemical parameters with Hydrolab probe on monthly schedule.

Activity 1.a.2. Index benthic sediment and organism populations and diversity before, during and after rearing activities.

Data collected from the water quality monitoring program will establish maximum rearing limitations while ensuring compliance with Federal and State guidelines.

Task 1.b. Collect and analyze homing and straying information from releases at current net-pen sites.

Activity 1.b.1. Analyze CWT recovery data from hatcheries and natural spawning areas for coho, select area bright fall chinook, and spring chinook in Columbia River and adjacent coastal escapement areas.

The SAFE project staff is required to report annually on June 30 to NMFS on straying issues, and identify and implement all steps necessary to maintain a proportion of non-ESU stocks on spawning grounds at less than 5%.

Objective 2. Determine the potential for the Tongue Point Turning Basin, South Channel, Deep River, Blind Slough, Prairie Channel and Steamboat Slough sites for harvest of target and non-target fish stocks.

Task 2.a. Conduct test fishing activities during spring and fall periods to determine relative abundance and timing through the area of target and non-target fish stocks.

Activity 2.a.1. Contract with fishermen and develop schedules for test fishing activities.

Activity 2.a.2. Collect, analyze and evaluate CWT and other biological data from test fishing efforts.

The SAFE project will report on the relative abundance and run timing of target and non-target species/stocks.

- Task 2.b. Initiate and evaluate commercial and recreational select area fisheries.
 - Activity 2.b.1. Develop seasons, monitor and evaluate fisheries, determine stock composition of harvest, and collect biological data.

Project staff will recommend seasons based on time, gear, and area parameters resulting from test fishing information. On-board monitoring occurs as necessary, in-season monitoring of the harvest for CWT recovery occurs at a minimum of 50 percent, and other biological data will be collected to assure compliance with ESA requirements. Post season evaluation includes species/stock composition of harvest to document impacts on non-target, weak stocks, and contribution/value of target stocks.

- Objective 3. Evaluate the suitability of various anadromous fish stocks for use in select area fishing sites.

- Task 3.a. Evaluate the effects of various rearing regimes in Oregon for spring chinook on survival and contribution to fisheries.
 - Activity 3.a.1. Obtain eggs at ODFW facilities to rear and release 1.3 million '99 brood spring chinook.
 - Activity 3.a.2. Transfer 900,000 '99 brood eyed eggs to Gnat Creek Hatchery for incubation and early rearing.
 - Activity 3.a.3. Receive 425,000 '98 brood spring chinook fingerlings from Gnat Creek Hatchery in November, 1999, and rear at Tongue Point, Blind Slough, and Youngs Bay under a winter dormancy/regular ration feeding regime for an April, 2000, release. (Six groups of 25,000 CWT)
 - Activity 3.a.4. Receive 425,000 '98 brood spring chinook fingerlings from Gnat Creek Hatchery in November, 1999, and rear at Tongue Point, Blind Slough, and Youngs Bay under a "natures" program in collaboration with Walt Dickhoff (NMFS) for a March, 2000, release. Target release size of 12 fish/lb. (Six groups of 25,000 CWT)

Project staff will evaluate rearing regimes and expect a significant increase in survival for winter dormancy and "natures" releases.

- Task 3.b. Evaluate the effects of various rearing regimes in Washington for spring chinook on survival and contribution to fisheries.

Activity 3.b.1. Receive 150,000 '98 brood spring chinook from WDFW's Grays River Hatchery in November, 1999, and rear at a Deep River site under a winter dormancy/regular ration feeding regime for a year 2000 release, with special attention to ensuring that juvenile chum have left the system. Target release size of 12 fish/lb. (Two groups of 25,000 CWT)

Activity 3.b.2. Obtain eggs at Cowlitz River Hatchery sufficient to rear and release 300,000 '99 brood spring chinook.

Activity 3.b.3. Transfer 325,000 '99 brood eyed eggs to Grays River Hatchery for incubation and early rearing.

Project staff will evaluate rearing regimes and expect a significant increase in survival for the winter dormancy release group.

Task 3.c. Evaluate the effects of various rearing regimes in Oregon for select area bright fall chinook on survival, contribution to fisheries, and straying.

Activity 3.c.1. Obtain eggs from ODFW's Big Creek and Klaskanine hatcheries sufficient to rear 400,000 '99 brood SABs to a size of 13 fish/lb.

Activity 3.c.2. Transfer 800,000 eyed eggs from ODFW facilities to CEDC's South Fork incubation site; incubate and transfer alevins to Youngs Bay net pens in March, 2000.

Activity 3.c.3. Rear 50,000 '99 brood from alevin to release on July 15, 2000, under a comparative "natures" program in collaboration with Walt Dickhoff (NMFS). Target release size of 13 fish/lb. (Two groups of 25,000 CWT, 100% LV)

Activity 3.c.4. Rear 350,000 '99 brood from alevin to release on July 15, 2000, under a rearing density of 0.5 lbs/cu.ft. (25,000 CWT, 100% LV)

Project staff will report on year 2000 releases of '99 brood SABs and expect increased survival for the "natures" release group. Straying levels are expected to comply with ESA requirements.

Task 3.d. Evaluate the effects of various rearing requirements in Oregon for upriver bright fall chinook on survival, contribution to fisheries, and straying.

- Activity 3.d.1. Obtain eggs from ODFW's Bonneville Hatchery sufficient to rear and release 350,000 '99 brood upriver brights to a size of 13 fish/lb.
- Activity 3.d.2. Transfer 375,000 eyed eggs to CEDC's South Fork incubation site, incubate and transfer alevins to Youngs Bay net pens in March, 2000.
- Activity 3.d.3. Rear 350,000 '99 brood from alevin to release on July 15, 2000, under a rearing density of 0.5 lbs/cu.ft. (25,000 CWT, 100% RV)

Project staff will report on year 2000 releases, and will compare to select area bright results in Activity 3.c.4.

- Task 3.e. Evaluate effects of various rearing regimes in Oregon on early stock lower Columbia River coho on survival and contribution to fisheries.
 - Activity 3.e.1. Obtain eggs and rear sufficient numbers for release of 600,000 '99 brood coho.
 - Activity 3.e.2. Receive 200,000 '98 brood coho fingerlings from ODFW's Oxbow Hatchery in November, 1999, at Tongue Point net-pen site and rear under a winter dormancy/regular ration feeding regime for a May, 2000, release. (Two groups of 25,000 CWT)
 - Activity 3.e.3. Receive 200,000 '98 brood coho fingerlings from ODFW's Oxbow Hatchery in November, 1999, at Blind Slough net-pen site and rear under a winter dormancy/regular ration feeding regime for a May, 2000, release. (Two groups of 25,000 CWT)
 - Activity 3.e.4. Receive 150,000 '98 brood coho fingerlings from ODFW's Oxbow Hatchery in November, 1999, at Youngs Bay net-pen site and rear under a winter dormancy/regular ration feeding regime for a May, 2000, release. (Two groups of 25,000 CWT)
 - Activity 3.e.5. Receive 50,000 '98 brood coho fingerlings from ODFW's Oxbow Hatchery in November, 1999, at Youngs Bay net-pen site and rear under regular feeding regime for lower Columbia mainstem release. (Two groups of 25,000 CWT)

Project staff will report and evaluate the year 2000 release of coho and compare to the similar feeding and release regimes of spring chinook from the various select area sites. Survival increases are expected from winter dormancy and mainstem

releases.

- Task 3.f. Evaluate effects of various rearing regimes in Washington on early stock lower Columbia River coho on survival and contribution to fisheries.
- Activity 3.f.1. Obtain eggs and rear sufficient numbers for release of 600,000 '99 brood coho.
 - Activity 3.f.2. Receive 200,000 '98 brood coho fingerlings from WDFW's Grays River Hatchery in November, 1999, at the upper Deep River net-pen site and initiate a winter dormancy/regular ration feeding regime for a release in the spring of 2000, subsequent to complete outmigration of Grays River chum smolts. (Two groups of 25,000 CWT)
 - Activity 3.f.3. Receive 200,000 '98 brood coho fingerlings from WDFW's Grays River Hatchery in November, 1999, at the lower Deep River net-pen site and initiate a winter dormancy/regular ration feeding regime for a release in the spring of 2000, subsequent to complete outmigration of Grays River chum smolts. (Two groups of 25,000 CWT)
 - Activity 3.f.4. Receive 200,000 '98 brood coho fingerlings from WDFW's Elochoman Hatchery in November, 1999, at the Steamboat Slough net-pen site and initiate a winter dormancy/regular ration feeding regime for a release in May, 2000. (Two groups of 25,000 CWT)

Project staff will report and compare the year 2000 releases of coho to the other coho releases at select areas. Survival increases are expected from winter dormancy releases.

Objective 4. Coordinate activities with WDFW, ODFW, CEDC, BPA, NMFS, and SFA.

- Task 4.a. Coordinate all objectives, tasks, and activities undertaken jointly to ensure complementary products and minimal overlap of actions.
- Activity 4.a.1. Co-host bimonthly coordination meetings of involved or interested parties to further develop work plans, collaborate, and report on progress.
 - Activity 4.a.2. Promote dialogue and participation in all projects that are affected by select area fisheries development.

Project staff will document all coordination activities during contract period.

Objective 5. Continue development activities to provide for additional research capabilities at the Clifton site.

Task 5.a. Undertake initial site preparation and obtain necessary permit approvals.

Activity 5.a.1. Obtain property owner permission and agreement to utilize site.

Activity 5.a.2. Develop and implement rearing and release strategies.

Activity 5.a.3. Initiate construction activities to accommodate research needs.

Project staff will report on developmental progress at the Clifton site.

Objective 6. Compile and report SAFE project results.

Task 6.a. Complete 1998 annual report (contract period October 1, 1997 through September 30, 1998).

Task 6.b. Begin 1999 annual report (contract period October 1, 1998 through September 30, 1999).

Task 6.c. Provide detailed report to NMFS on observed and estimated impacts to listed species resulting from SAFE project activities.

Project staff will submit final 1998 annual report (May, 2000), and provide report to NMFS as required (June, 2000).

f. Methods

SAFE project design is simply to utilize hatchery fingerling production for net-pen rearing, acclimation, and release as smolts at suitable lower Columbia River off-channel locations. Resultant returns of adults are targeted for harvest. Project staff designs studies to determine which rearing variables (smolt size/condition, rearing density, release time, release site) are most important to maximize survival, optimize economic benefits, and best utilize hatchery production.

Monitoring activities are in place to: 1) minimize impacts to the adjacent habitat resulting from rearing operations; 2) minimize interaction with other outmigrating smolts upon release; 3) minimize take of weak stocks in subsequent fisheries targeting returning adults; and 4) ensure straying rates of SAFE project adults are in compliance with state and federal mandates. The SAFE project was recently scrutinized by the NPPC in their three-step review process for expansion into two new sites. After favorable independent peer review, the Council recommended funding site expansions (letter, October 19, 1998, NPPC). Review of the SAFE project has also been completed relating to project activities affecting listed and proposed-to-be listed species under the Endangered Species Act. NMFS recently issued a Biological Opinion

with a “no jeopardy” finding.

To address Objective 1 (Suitability of sites to rear and release salmon), water quality and bio-monitoring programs have been in place to document ecological impacts from net-pen rearing activities. Physicochemical monitoring is conducted monthly (24-hour periods at 30 minute intervals) using a Hydrolab multiparameter water testing device. Aquatic biomonitoring is conducted three times annually (before, during and after rearing activities) using a petite ponar dredge to collect benthos at control and impact sites. Changes to species biodiversity at the impact sites are measured by three indices (Shannon’s Diversity Index, Simpson’s Diversity Index, and Pielou’s Evenness Index) widely used in evaluation of ecological systems (BPA, 1998. p. 37-41).

The suitability of rearing and release sites will also be evaluated based on their ability to produce adults that successfully return to the site of release. Project staff representatively coded-wire tag (CWT) each release group to enable recovery of strays to hatcheries and spawning grounds. The Pacific States Marine Fisheries Commission (PSMFC) CWT recovery data base is the source by which stray recoveries are accounted for. Stray rates are calculated using population estimates for escapement components provided by state agencies (BPA, 1998. p. 78).

To address Objective 2 (Potential of sites for harvest of target and non-target fish stocks), test fishing during spring and fall periods has been conducted adjacent to rearing sites using contracted gillnetters with various sizes of gillnets. By fishing weekly, at various tidal stages, during daylight and dark, and at predetermined locations, the base fishery parameters of the time, area, and gear can be delineated for each site (BPA, 1998. p. 104, 123).

Initiation of commercial and recreational fisheries are based on results and analysis of test fishing data. To determine the successful execution of fisheries directed at SAFE project fish the staff requires in excess of 50 percent of the commercial catch examined for recovery of CWT fish. PSMFC recovery program goals are for 20 percent. SAFE project staff are directly involved in season recommendations. Impact of fisheries on weak stocks and those listed under ESA are estimated based on CWT recoveries and the run reconstruction data base maintained by the Technical Advisory Committee under the U.S. v. Oregon Columbia River Fish Management Plan.

To address Objective 3 (Evaluation of stock suitability for use in select area fishing sites), the SAFE project conducts rearing, acclimation, and release studies with early stock coho. Willamette and Cowlitz stock spring chinook, upriver bright fall chinook, and select area bright stock (Rogue River origin) fall chinook. All project fish are reared in floating, net-pen confinements at each site (BPA, 1995. p. 7 and 10). Additionally, all fish culture regimes are conducted under the criteria and policies of the Integrated Hatchery Operations Team. Net-pen rearing regimes include: 1) overwinter rearing (coho and spring chinook); 2) full-term, net-pen rearing (fall chinook); 3) short-term, net-pen acclimation and release (all species); 4) winter dormancy studies in collaboration with NMFS (spring chinook and coho); and 5) rearing density experiments (all species). All releases will be coded-wire tagged to a minimum of 25,000 per release group to facilitate evaluation of survival, straying, fishery contribution, and site/stock/suitability issues. All CWT releases are reported to PSMFC and subsequent recoveries are the base for evaluation of Objective 3.

Without continued collaboration of projects associated with avian predation (#970240); coded-wire tag recovery in Oregon and Washington (#8201300, #8906900, #8906600); and wild smolt behavior/physiology, “natures” (#9202200), success of the SAFE project may be limited.

g. Facilities and equipment

Administration of the project is conducted out of the ODFW office in Clackamas, the WDFW office in Vancouver, and the CEDC office in Astoria. In the WDFW/Vancouver office, a water quality laboratory has been established. The project stores most field equipment at regional hatcheries adjacent to the select area sites where fish are reared.

Experimental fish essential for the project are initially reared at WDFW’s Grays River, Elochoman and Cowlitz hatchery facilities, and at the ODFW facilities - Gnat Creek, Bonneville Complex, and Klaskanine.

Major equipment includes net pens at Youngs Bay (80), Tongue Point (16), Blind Slough (16), Deep River (28), and Steamboat Slough (12). Also included are two Hydrolab water sampling devices, two computers, two motorized barges, and two forklifts.

As expansion to additional sites develops, associated increases in net-pen numbers, equipment, and materials & supplies will be necessary.

h. Budget

The FY 2000 budget in total is \$1,500,000, an increase of \$100,000 from FY 1999. Personnel budget increased by approximately \$85,000 and fringe benefits increased by approximately \$30,000; as a result of work-force needs to accommodate the expansion at Deep River and Steamboat Slough. Supplies and materials increased by approximately \$18,000 and allows for the additional feed and coded-wire tagging associated with the increase in fish numbers. Operation and maintenance increased approximately \$4,000 and is expected to provide for an additional vehicle lease. Capital acquisitions/improvements decreased by about \$132,000 because of reduced needs for net pens and associated site development costs. Travel costs are budgeted and expected to be approximately the same. Indirect costs increased by approximately \$13,000 and is reflective of an increase in the total budget, except for capital acquisitions. Subcontracts increased by about \$2,000 and is associated with Activity 3.e.5.; subcontracting needs for fishers towing net-pens to mainstem Columbia release locations.

Section 9. Key personnel

SAFE project is a cooperative three agency project led by Jim Hill, Paul Hirose, and Marc Miller.

Jim Hill, CEDC (1978 to present), Fisheries Project Director. Bachelors of Science (Fisheries Science) from Oregon State University in 1977. Through Clatsop County’s Economic Development Council the current primary responsibility is to provide leadership for the successful

salmon enhancement program in Youngs Bay and other potential sites. Through this program, the concept of net-pen acclimation in the lower Columbia was pioneered.

Primary responsibilities associated with the Select Area Fishery Evaluation Project are to provide oversight, advice, coordination, and supervise activities regarding the experimental releases of fish, including collaboration with others.

Relevant Publications:

Hill, James M. and Todd Olson 1988. Evaluation of a low-cost salmon production facility. Bonneville Power Administration: DOE/BP - 11887-4. 38 pp.

Hirose, Paul, Marc Miller & Jim Hill. 1996. Columbia River: Terminal Fisheries Research Project, 1994 Annual Report. Bonneville Power Administration: DOE/BP - 05409-1. 151 pp.

Hirose, Paul, Marc Miller & Jim Hill. 1998. Columbia River: Select Area Fishery Evaluation Project, 1995-96 Annual Reports. Bonneville Power Administration. 194 pp.

Paul S. Hirose, ODFW (1971 to present), Natural Resources Specialist 3. Bachelor of Science in Fisheries Science in 1968, from the University of Washington.

Entire professional career (28 years) in the Columbia River Management Group with the State of Oregon.

During 1971-87 (17 years) employed as assistant project leader responsible for management of the lower Columbia River commercial fisheries. Primary duties during this period included: 1) coordination of commercial fishery sampling programs; 2) coordination of spawning sampling programs; 3) development of preseason run size predictions for Oregon Production Index (OPI) coho and upriver spring chinook, 4) development of estimates of incidental handle and mortality of steelhead caught during winter salmon gillnet seasons, 6) coordination of gillnet test fishing programs for spring chinook at Woody Island (RM 28), sockeye in Zones 1-2, and fall salmon in Zones 1-2.

During 1988 to present, promoted to the project leader (NRS 3) with responsibilities in the same areas as in previous years. Additional duties include developing recommendations for commercial fishing seasons in the lower Columbia River including Youngs Bay. During 1991-95, acted as ODFW technical contact for “Youngs Bay Terminal Fisheries Project” funded by BPA (Project No. 97-22). During 1993-present, principle duties include ODFW technical contact for “Columbia River Select Area Fishery Evaluation Project” (formerly titled “Columbia River Terminal Fisheries Research Project”), Project No. 9306000.

As project leader of the Oregon portion of the Columbia River Select Area Fishery Evaluation (SAFE) Project, Paul Hirose is responsible for coordinating and directing tasks and activities in Oregon select areas. Coordination of work with Jim Hill (CEDC) and Marc Miller (WDFW) is essential for effective execution of the SAFE project.

Relevant Publications:

Final Completion Report: Evaluation of 1991-92 Brood Overwinter-Reared Coho Released from Net Pens in Youngs Bay.

Hirose, Paul, Marc Miller & Jim Hill. 1996. Columbia River Terminal Fisheries Research Project, 1994 Annual Report. Bonneville Power Administration: DOE/BP - 05409-1. 151 pp.

Hirose, Paul, Marc Miller & Jim Hill. 1998. Columbia River: Select Area Fishery Evaluation Project, 1995-96 Annual Reports. Bonneville Power Administration. 194 pp.

Miller, Marc C., Cindy Le Fleur, Anne Marshall and Paul Hirose. 1993. Genetic stock identification estimates of spring chinook stock composition in the Columbia River winter gill net fishery, 1987-1992. Washington Department of Fisheries. Tech. Rept. 121. 16 pp.

Authored several management staff reports documenting results of test fishing, spawning fish surveys, and on-board monitoring to estimate steelhead handle during target salmon gill-net fisheries.

Marc Miller, WDFW (1976 to present), Fish & Wildlife Biologist 3. Bachelor of Science (Fishery Science) from Humboldt State University in 1973. Specialized in salmon fishery management for length of employment with WDFW: PFMC ocean fishery plan development (1976-1979), ocean fishery monitoring (1979-1990), application of genetic stock identification to salmon fishery management (1985-1993), and select area fishery development (1993 to present).

Recent activities (1993 to present) have been out of the WDFW field office in Vancouver (originally Battle Ground), as project leader on the Washington portion of the Select Area Fishery Evaluation Project (9306000). In the first year, several Washington sites were established as having potential and each has been monitored for existing fish populations and water quality characteristics. Net pens were placed in Deep River in 1995 and two fisheries have been conducted on early run coho reared at the site. The project is now expanding within Deep River, and to Steamboat Slough.

Relevant Publications:

Miller, Marc, Cindy Le Fleur, Anne Marshall and Paul Hirose. 1993. Genetic stock identification estimates of spring chinook stock composition in the Columbia River winter gill net fishery, 1987-1992. Washington Department of Fisheries. Tech. Rept. 121. 16 pp.

Hirose, Paul, Marc Miller & Jim Hill. 1996. Columbia River: Terminal Fisheries Research Project, 1994 Annual Report. Bonneville Power Administration: DOE/BP - 05409-1. 151 pp.

Hirose, Paul, Marc Miller & Jim Hill. 1998. Columbia River: Select Area Fishery Evaluation Project, 1995-96 Annual Reports. Bonneville Power Administration. 194 pp.

Authored several WDFW technical reports relative to salmon fishery monitoring and management.

Section 10. Information/technology transfer

Technical information from this project will be distributed through annual reports, public and professional meetings, and Salmon for All's educational and promotional activities associated with select area fisheries. Continued opportunities for media coverage include Oregon Public Broadcasting documentaries, live radio talk shows, newspaper stories and local television news coverage (special interest). Provide information to commercial interests (banks) regarding future potential of select area fisheries. Finally, meetings with policy level interests will be attended and promoted. Past information exchange through this distribution and efforts through Task 4.c. has prompted interest from other areas and organizations for potential application of this technology to Oregon and Washington coastal estuaries.

Congratulations!